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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/560,447 12/12/2005 Paulus Martinus Catharina Hesen NL030692US1 3088

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EXAMINER

CHHAYA, SWAPNEEL

ART UNIT	PAPER NUMBER
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2822

NOTIFICATION DATE	DELIVERY MODE
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07/31/2007

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No. 10/560,447	Applicant(s) HESEN ET AL.	
	Examiner Swapneel Chhaya	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/12/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 16 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). Accordingly, the claim has not been further treated on the merits.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Heinlen et al. (U.S. Patent 3736367).

Regarding claim 1.

A lead frame provided with

A frame (2) having a first (6,18) and a second (10,18) connection conductor which connection conductors are each connected to the frame and (Fig. 1-5 column 2 lines 25-45)

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Provided with a non-engaging end portion (24), where, after deformation, the end portion of the second connection conductor can be positioned opposite the first connection conductor (Fig. 1-5 column 2 lines 25-45)

A semiconductor element can be placed between said connection conductors, (Fig. 1-5 column 2 lines 55-65)

characterized in that the end portion of the second connection conductor within the frame is positioned outside the extension of the first connection conductor and can be brought to a position opposite the position of the semiconductor element by bending along a bending axis which is at an oblique angle with respect to the longitudinal axis of the end portion. (Fig. 4-5 column 2 lines 25-45)

Regarding claim 2.

A lead frame as claimed in claim 1, characterized in that the end portion (24) of the second connection conductor has been brought to a position opposite the position of the semiconductor element by bending along a bending axis which is at an oblique angle with respect to the longitudinal axis of the end portion. (Fig. 4-5 column 2 lines 25-45)

Regarding claim 3.

A method of manufacturing a semiconductor device comprising the steps of:

- providing a semiconductor element having a first and a second electric connection

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region which connection regions are situated at opposite sides of the semiconductor element (Fig. 1-5 column 2 lines 55-65)

- providing a lead frame as claimed in claim 2 (see above)
- fitting the semiconductor element between the end portions of the first connection conductor, where connection means are used to make electro-conductive connections between the connection regions and the end portions. (Fig. 1-5 column 2 lines 55-65)

Regarding claim 4.

A method of manufacturing a semiconductor device comprising the steps of:

- providing a semiconductor element having a first and a second electric connection region which connection regions are situated on opposite sides of the semiconductor element; (Fig. 1-5 column 2 lines 55-65)
- providing a lead frame (2) having a frame with a first (6, 18) and a second connection (10, 18) conductor which connection conductors are each connected to the frame and provided with an exposed end portion; (Fig. 1-5 column 2 lines 25-45)
- applying the semiconductor element to the end portion of the first connection conductor an electro-conductive connection between the first connection region and the end portion being made by using a connection means; (Fig. 1-5 column 2 lines 55-65)
- moving the end portion of the second connection conductor to a position outside the plane of the frame and opposite a location for the second connection region of the semiconductor element (Fig. 3-5 column 2 lines 25-65)

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- making an electro-conductive connection between the second connection region and the end portion of the second connection conductor by using a connection means, characterized in that the end portion of the second connection conductor within the frame is positioned outside the extension of the first connection conductor and is brought to a position opposite the position for the second connection region of the semiconductor element by bending along a bending axis which is at an oblique angle with respect to the longitudinal axis of the end portion. (Fig. 3-5 column 2 lines 25-65 column 3 lines 35-55)

Regarding claim 5.

A method as claimed in claim 4, characterized in that the end of the end portion of the second connection conductor is bent through approximately 90 degrees along the bending axis out of the plane of the frame, and the end of the end portion is bent, along a further bending axis extending substantially parallel to the bending axis and at a distance therefrom corresponding approximately to the thickness of the semiconductor element, through an angle of approximately 90 degrees to the position of the semiconductor element (Fig. 3-5 column 3 lines 35-54)

Regarding claim 6.

A method as claimed in claim 5, characterized in that the end portion of the second connection conductor is bent

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along the further bending axis or along another bending axis in such a manner that said end portion extends obliquely in at least one direction with respect to the end portion of the first connection conductor which contains the position for the semiconductor element (Fig. 3-5 column 3 lines 35-54)

Regarding claim 7.

A method as claimed in claim 4,
characterized in that the semiconductor element is slid between the connection conductors after the end portion of the second connection conductor has been bent to a position opposite the location for the second connection region of the semiconductor element and opposite the end portion of the first connection conductor, the element being clamped between the connection conductors. (Fig. 1-5 column 2 lines 55-65)

Regarding claim 9.

A method as claimed in claim 3,
characterized in that before the semiconductor element is slid between the connection conductors, the end portion of the first connection conductor is maintained in a depressed position by means of a pressure member, until the semiconductor element has been slid between the connection conductors. (Fig. 1-5 column 2 lines 55-65)

Regarding claim 10.

A device for carrying out a method as

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claimed in any one of claims 3 through 9, characterized in that the device comprises:

- a transport mechanism (4) for a lead frame with at least two connection conductors

(Fig. 1-5 column 2 lines 25-45)

- positioning means for positioning a semiconductor element (Fig. 1-5 column 2 lines 25-65)

- pusher means for pushing the semiconductor element in between the two connection conductors (6, 8, 10, 18) of which one is bent to a position above the position of the other one (Fig. 1-5 column 2 lines 55-65), please note that the pusher member is implicitly stated in lines 55-65 because the chip is "resiliently" held in position and the thickness increases, which means that the element increases the size of a chip and the metal that the lead is made from is not malleable enough to enable the placement of the transistor

Regarding claim 11.

A device as claimed in claim 10,

which further comprises means for bending an end portion of at least one of the connection conductors along a bending axis which makes an oblique angle with the longitudinal axis of the end portion. (Fig. 3-5 column 3 lines 35-55)

Regarding claim 12.

A device as claimed in claim 10,

characterized in that it comprises pressure means for pressing downward one of the

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conductor tracks during the pushing against the semiconductor element (Fig. 1-5 column 2 lines 55-65), please note that the pusher member is implicitly stated in lines 55-65 because the chip is "resiliently" held in position and the thickness increases, which means that the element increases the size of a chip and the metal that the lead is made from is not malleable enough to enable the placement of the transistor

Regarding claim 13.

A semiconductor device comprising:

- a semiconductor element which is provided with a first and a second electric connection region, which connection regions are situated on opposite sides of the semiconductor element (Fig. 1-5 column 2 lines 55-65)
 - a first connection conductor (6, 8, 10) having a contact, and facing away therefrom, an end portion (18) which is electro-conductively connected to the first connection region (Fig. 1-5 column 2 lines 25-67)
 - a second connection conductor (6, 8, 10) having a contact, and facing away therefrom, an end portion (18) which is bent along a bending axis which is at an oblique angle with respect to the longitudinal axis of the end portion, such that the end portion is situated opposite the second electric connection region, with which it is electro-conductively connected, while the contact is situated in the same plane as the contact of the first connection conductor (Fig. 3-5 column 2 lines 25-65 column 3 lines 35-55)
- an isolating envelope which leaves contacts facing way from the end portions of the connection conductors uncovered.

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Regarding claim 15. A semiconductor device as claimed in claim 13, characterized in that:

- the semiconductor element is a semiconductor transistor with a third connection region (Fig. 1-5 column 2 lines 55-65)
- a third connection conductor (6,8,10) is present, which has a contact, and facing away therefrom, an end portion (18) which is bent along a bending axis which is at an oblique angle with respect to the longitudinal axis of the end portion, such that the end portion is situated opposite the third electric connection region, with which it is electro-conductively connected, while the contact is situated in the same plane as the contact of the first connection conductor;(Fig. 3-5 column 3 lines 35-54)
- the second (6) and the third connection (10) conductor are situated on either side of the first connection conductor (10) (Fig. 1-5)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 8 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heinlen et al. (U.S. Patent 3736367) as applied to claim 13 above in view of Sakamoto et al. (U.S. Patent 6975022).

Regarding claim 8. Heinlin discloses:

A method as claimed in claim 3, characterized in that

- a lead frame is chosen in which the first connection conductor is provided with a hole (36) at a distance from the position of the semiconductor element (Fig. 1)

Heinlin discloses the claim except for the semiconductor element being placed on the hole and fixed by means of a suction device and the pushing means.

Sakamoto discloses:

- the semiconductor element (15) is placed on the hole and fixed by means of a suction device (24, V) present below the hole, after which the semiconductor element is pushed between the connection conductors by means of a pusher member (Fig. 1-5-11 column 8 lines 30-60 column 9 lines 10-15)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to implement a suction device, and a pusher member as taught by Sakamoto, since *Sakamoto* states at column 8 lines 30-60 that such a modification would aid in mounting and fixing the semiconducting device.

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Regarding claim 14.

A semiconductor device as claimed in claim 13, characterized in that:

Sakamoto discloses:

-the semiconductor element is a semiconductor diode (Fig. 1-5-11 column 12 lines 9-11)

Heinlen discloses:

-The second connection conductor is u-shaped or j-shaped prior to bending (Fig. 1)

(and

-the contacts of the connection conductors are in line with one another (Fig. 1-5)

Heinlin in view of Sakamoto discloses the claimed invention except for the oblique angle range of the lead frame. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use such a range, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Swapneel Chhaya whose telephone number is 571-270-1434. The examiner can normally be reached on Monday- Thursday 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SC


Keshia I. Rose
Primary Examiner
July 23, 2007